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**United States Patent**  
**Wu et al.**

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(54) **LIGHT WEIGHT BOARD OF IMPROVED SURFACE FLATNESS AND PROCESS FOR PRODUCTION THEREOF**

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(51) **Int. Cl.**  
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**B29C 44/34** (2006.01)  
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**E04C 2/34** (2006.01)

(52) **U.S. Cl.** ..... **428/178; 428/188; 428/313.3; 428/314.4; 52/793.1**

(58) **Field of Classification Search** ..... None  
 See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

3,220,595 A 11/1965 Edwards  
 3,274,315 A 9/1966 Kawamura  
 3,509,005 A 4/1970 Hartig  
 3,664,906 A 5/1970 Hartig  
 3,642,550 A 2/1972 Doll  
 3,741,857 A 6/1973 Kakutani et al.

3,748,214 A 7/1973 Withers  
 3,792,951 A 2/1974 Meyers  
 3,837,973 A 9/1974 Asakura et al.  
 4,513,048 A 4/1985 Kauhe et al.  
 5,658,644 A 8/1997 Ho et al.  
 5,910,226 A 6/1999 Moeder  
 6,306,520 B1 10/2001 Nagata et al.  
 6,617,009 B1 9/2003 Chen et al.  
 2002/0011047 A1 1/2002 Obeshaw  
 2003/0215613 A1 11/2003 Jan et al.

**OTHER PUBLICATIONS**

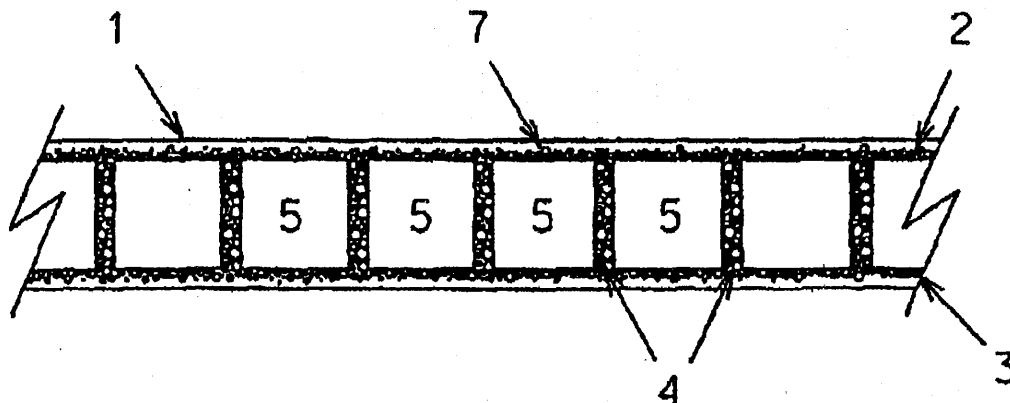
Complaint for Patent Infringement against Coroplast, Inc., with Exhibit A, dated Sep. 16, 2008.  
 Defendant Coroplast's Answer and Counterclaims against plaintiff Intoplast Group, Ltd. dated Apr. 14, 2009.  
 Plaintiff's Reply to Defendant's Counterclaim with Affirmative Defenses by Intoplast Group, Ltd. dated Apr. 21, 2009.  
 Motion to Stay Pending Outcome of Reexamination Proceedings Involving U.S. Pat. No. 6,759,114 by Defendant Coroplast, Inc. dated May 27, 2009.

(Continued)

*Primary Examiner*—Jerry D. Johnson

(57) **ABSTRACT**

An extruded hollow thermoplastic board, which includes a pair of flat and parallel sheets spaced apart and interconnected by extending ribs, generally has a plurality of depression bands in the areas where the flat sheets and extending ribs are joined. The bands, which negatively affect the surface flatness, are especially apparent for crystalline thermoplastic materials. A hollow thermoplastic board, which effectively reduces the depth of the depression bands by inclusion of locationally fixed gas pockets in the rib area during production, is disclosed in the present invention. The hollow thermoplastic board of the present invention substantially enhances the surface smoothness and is highly beneficial to applications such as printing, lamination and graphic art. The present invention also provides a method for production of the hollow thermoplastic boards of smooth surfaces.



**EXHIBIT**

**A**

**US 6,759,114 C1**

Page 2

**OTHER PUBLICATIONS**

Memorandum in Support of Defendant's Motion to Stay Pending Outcome of Reexamination Proceedings Involving U.S. Pat. No. 6,759,114 filed by Defendant Coroplast, Inc. with Exhibit A, dated May 27, 2009.

Plaintiff's Memorandum in Opposition to Defendant's Motion to Stay Pending Outcome of Reexamination, with Exhibit A, dated Jun. 8, 2009.

Defendant Coroplast, Inc.'s Reply Memorandum in Support of Motion to Stay Pending Outcome of Reexamination Proceedings Involving U.S. Pat. No. 6,759,114, with Exhibits A and B, dated Jun. 18, 2009.

Court's Memorandum and Order dated Jun. 23, 2009.

Joint Notice of Action in Reexamination Proceedings Involving U.S. Pat. No. 6,759,114, with Exhibit A, dated Sep. 4, 2009.

Joint Notice of Office Action, with Exhibit A, dated Nov. 19, 2009.

Order staying matter before the Court, dated Nov. 30, 2009.

Letter from Kevin B. Laurence to David W. Harlan dated Dec. 2, 2008, with description of a declaration of Kenneth VanderVelde and associated attachments.

Declaration of Kenneth VanderVelde dated Dec. 1, 2008, with attachments.

US 6,759,114 C1

**1**  
**EX PARTE**  
**REEXAMINATION CERTIFICATE**  
**ISSUED UNDER 35 U.S.C. 307**

THE PATENT IS HEREBY AMENDED AS  
INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in *italics* indicates additions made to the patent.

ONLY THOSE PARAGRAPHS OF THE  
SPECIFICATION AFFECTED BY AMENDMENT  
ARE PRINTED HEREIN.

Column 7, line 63-Column 8, line 5:

Example 1

[Prior Art]

In the Example, the die configuration is as shown in FIG. 5. The thermoplastic material used is polypropylene with antistatic and ultraviolet protective additives and white pigment. An extrusion assembly *that* contains three extruder is used. The thermoplastic materials for the three extruders are the same. The extrusion temperatures are between 150 and 240 degree° C.

Column 8, line 28-line 46:

Example 2

[Present Invention]

In this example, the production equipment and the thermoplastic materials used for the top and bottom skin layers are the same as those in Example 1. The extrusion temperatures for the top and bottom skin layers are between 150 and 240 degree° C. 0.7% chemical blowing agent concentrate, which decomposes to generate carbon dioxide gas at elevated temperatures, is added in the composition of the core layer, which includes the rib section of the hollow thermoplastic sheeting. Due to the plasticization effect of the carbon dioxide gas, the extrusion [temperatures] *tempera-* 40  
*ture* for the core layer is about 10 degree° C. below the settings in Example 1. In addition, the feeding zone temperature of the extruder has to be controlled below about 165 degree° C. in order not to initiate the reaction of blowing agent before entering extruder. The temperatures of the die 45  
assembly are from 180 to 240 degree° C.

AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:

The patentability of claims 2-6 and 8 is confirmed.

Claims 1, 7 and 9-11 are cancelled.

New claims 12-21 are added and determined to be patent- 60  
able.

12. A light weight hollow thermoplastic board, which  
comprises:

a first planar sheet;  
a second planar sheet; and

**2**

a plurality of ribs, each of said ribs having a plurality of  
fixed gas pockets located therein;  
wherein said fixed gas pockets are small closed bubbles  
forming a foamed extension to said ribs;  
wherein said first planar sheet and said second planar are  
spaced apart by and are interconnected by said ribs;  
and  
wherein said first and second planar sheets are of thermo-  
plastic material generally free of gas pockets compris-  
ing closed bubbles.

13. The light weight hollow thermoplastic board of claim  
12, wherein the thermoplastic material of the ribs contains a  
blowing agent and the thermoplastic material of the first and  
second sheets do not contain a blowing agent.

14. The light weight hollow thermoplastic board of claim  
12, wherein the first and second sheets and ribs are formed  
as an integral extrusion.

15. The light weight hollow thermoplastic board of claim  
12, further comprising depression bands in outer surfaces of  
the first and second sheets at locations corresponding to the  
ribs, the depression bands having depths and the ribs having  
lengths, and wherein the closed bubbles in the ribs expand  
the lengths of the ribs thereby to reduce the depths of the  
depression bands.

16. A light weight hollow thermoplastic board, which  
comprises:

a first planar sheet;  
a second planar sheet; and  
a plurality of ribs, each of said ribs having a plurality of  
fixed gas pockets located therein;  
wherein said fixed gas pockets are small closed bubbles  
forming a foamed extension to said ribs;  
wherein said first planar sheet and said second planar are  
spaced apart by and are interconnected by said ribs,  
wherein said first planar sheet comprises a top skin layer  
of thermoplastic material generally free of gas pockets  
comprising closed bubbles and said second planar  
sheet comprises a bottom skin layer of thermoplastic  
material generally free of gas pockets comprising  
closed bubbles.

17. The light weight hollow thermoplastic board of claim  
16, further comprising a core layer including said ribs, the  
core layer and top skin layer combining to form the first  
planar sheet, the core layer being a part of the first planar  
sheet, and the core layer and bottom skin layer combining to  
form the second planar sheet, the core layer being a part of  
the second planar sheet.

18. The light weight hollow thermoplastic board of claim  
17, wherein the top and bottom skin layers and the core layer  
are formed as an integral extrusion.

19. The light weight hollow thermoplastic board of claim  
17, wherein the top and bottom skin layers are made of the  
same thermoplastic material.

20. The light weight hollow thermoplastic board of claim  
17, wherein the thermoplastic material of the core layer con-  
tains a blowing agent and the thermoplastic material of the  
top and bottom skin layers do not contain a blowing agent.

21. The light weight hollow thermoplastic board of claim  
16, further comprising depression bands in outer surfaces of  
the top and bottom skin layers at locations corresponding to  
the ribs of the core layer, the depression bands having depths  
and the ribs having lengths, and wherein the closed bubbles  
in the ribs expand the lengths of the ribs thereby to reduce  
the depths of the depression bands.

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